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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/623,520 | 07/22/2003 | Yuuichiro Murahama | 240576US2 | 5816 |
| 22850 | 7590 | 11/16/2004 | EXAMINER | |
| OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314 | | | HUYNH, ANDY | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2818 | |

DATE MAILED: 11/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--------------------------------------|--|--|
| Office Action Summary | Application No. 10/623,520 | Applicant(s) MURAHAMA, YUUICHIRO | |
| | Examiner Andy Huynh | Art Unit 2818 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) 7-10, 17 and 18 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5, 6, 11-16 and 19-33 is/are allowed.
- 6) ☒ Claim(s) 1, 3 and 4 is/are rejected.
- 7) ☒ Claim(s) 2 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>07/22/2003</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

In the Response to Election/Restriction Requirement dated October 28, 2004, Applicant has elected Group I, claims **1-6, 11-16 and 19-33**, drawn to a device for prosecution is acknowledged. Because Applicant did not distinctly and specifically point out the supposed error in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Accordingly, claims **7-10, 17 and 18** are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 35 § 1.142(b) and MPEP § 821.03. Applicant has the right to file a divisional application covering the subject matter of the non-elected claims **7-10, 17 and 18**, drawn to a method.

Priority

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d) based on an application filed in JAPAN, 2002-213839 on 07/23/2002.

Information Disclosure Statement

This office acknowledges receipt of the following items from the applicant: Information Disclosure Statement (IDS) filed on 07/22/2003. The references cited on the PTOL 1449 form have been considered.

Drawings

The drawings are objected for the following reason.

Figures 1-11 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

Claim Rejections - 35 U.S.C. § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3, 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Gardner (USP: 6,033,943).

Regarding claim 1, Gardner discloses in Fig. 9 and the corresponding texts as set forth in column 5, line 34-column 9, line 40, a semiconductor device comprising:

a first gate insulating film/a second dielectric layer (116) formed in a first active region/a second region (106) of a semiconductor substrate (102) and having a first film thickness (t_2); and

a second gate insulating film/a first dielectric layer (108) formed in a second active region/a first region (104) of said semiconductor substrate and having a second film thickness (t_1) smaller than the first film thickness,

wherein a surface of the semiconductor substrate in the first active region/the second region (106) is lower than that in the second active region/the first region (104).

Regarding claim 3, Gardner discloses in Fig. 9 the device wherein the first and second active regions are isolated by a trench filled with an insulating film (107), and a gate electrode (120a, 120b) is formed on each of said first and second gate insulating films.

Regarding claim 4, Gardner discloses in Fig. 9 the device wherein said gate electrodes on said first and second gate insulating films are made of the same material/heavily doped polysilicon and have substantially the same thickness.

Allowable Subject Matter

Claim 2 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, since the prior art made of record and considered pertinent to the applicant's disclosure does not teach or suggest the claimed limitations. Gardner and ****, whether taken alone or in combination, fail to teach the claimed invention the device wherein the semiconductor substrate surface in the first active region is lower than that in the second active region by an amount corresponding to a difference between the first and second film thicknesses, so a surface height of said first gate insulating film is substantially equal to that of said second gate insulating film.

Claims 5, 6, 11-16 and 19-33 are allowed. The following is a statement of reason for the indication of allowable subject matter:

Claims 5, 6, 11-16 and 19-33 are considered allowable since the prior art made of record and considered pertinent to the application's disclosure do not teach or suggest the claimed limitations. Gardner fails to teach the claimed invention a semiconductor device comprises a

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first height which is a surface height of said semiconductor substrate in the first active region on a bottom surface of the trench element isolation region is lower than a second height which is a surface height of said semiconductor substrate in the second active region on the bottom surface of the trench element isolation region as recited in independent claim 5; a nonvolatile semiconductor memory comprises a transistor included in a peripheral circuit has a first gate insulating film formed in a first active region of a semiconductor substrate and having a first film thickness, a transistor included in a memory cell array has a second gate insulating film formed in a second active region of said semiconductor substrate and having a second film thickness smaller than the first film thickness, and a semiconductor substrate surface in the first active region is lower than that in the second active region as recited in independent claim 11; and a nonvolatile semiconductor memory comprises a transistor included in a peripheral circuit has a first gate insulating film formed in a first active region of a semiconductor substrate and having a first film thickness, a transistor included in a memory cell array has a second gate insulating film formed in a second active region of said semiconductor substrate and having a second film thickness smaller than the first film thickness, and on a bottom surface of a trench element isolation insulating region formed between the first and second active regions, a first height of a surface of said semiconductor substrate in the first active region is lower than a second height of the surface of said semiconductor substrate in the second active region as recited in independent claim 15.

Conclusion

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andy Huynh, (571) 272-1781. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The Fax number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the -status of this application or proceeding should be directed to the receptionist whose phone number is (703) 308-0956.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Ah

Andy Huynh

11/13/04

Patent Examiner